ART.NR. 990/103

Service Manual

MODEL: MS-103 FM/MW/SW1/SW2-10

MODEL: MS-103L FM/MW/LW/SW1-9

12 BAND RECEIVER

SANGEAN

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SPECIFICATIONS

FM ELECTRICAL PERFORMANCE

Test Item		Condition	Nominal	Limit	Unit
Tuning range		Min.	87.35	±0.15	MHz
		Max.	108.25	±0.25	MHz
Intermediate freq.			10.7	±0.1	MHz
Max. sens.		90MHz		20	db
		98MHz		20	db
		106MHz		20	db
Useable sens. (S/N 30db)		90MHz	20	26	db
		98MHz	20	26	db
		106MHz	20	26	db
Calibration		90MHz	±500	±1000	kHz
		98MHz	±500	±1000	kHz
		106MHz	±500	±1000	kHz
Audio fidelity (−6db)		98MHz	250	480	Hz
		98MHz	4000	3600	Hz
3db Limiting (10mV)		98MHz	20	26	db
Image rejection		106MHz	26	20	db
I.F. rejection		90MHz	80	60	db
A.F.C. hold range (1mV)		98MHz	600	400-800	kHz
T.H.D. (75kHz dev.)		98MHz	2	4	%
Lowest battery voltage		98MHz	1.85	2.1	V
Max. output power		98MHz	180	150	mW
Output power at 10% T.H.D.		98MHz	150	120	mW
Power consumption at R.O.		98MHz	110	130	mA
Stereo indicator sens.		98MHz	20	26	db
Tuning indicator sens.		98MHz	26	32	db
Over load capacity		98MHz		100	db
Am. suppression		98MHz	36	30	db
Min. output		98MHz	3	5	mV
S/N Ratio (1mV)		98MHz	46	36	db
Supply voltage : DC 3V	R. O. : 50mW	Load : 8 ohm	Modulation : 1kHz 22.5kHz Dev.		

SW1 ELECTRICAL PERFORMANCE (only MS-103)

Test Item		Condition	Nominal	Limit	Unit
Tuning range		Min.	2.2	2.3	MHz
		Max.	5.3	5.2	MHz
Intermediate freq.			460	±3.5	kHz
Max. sens.		2.75MHz	16	22	db
		4.0MHz	16	22	db
		5.0MHz	16	22	db
Useable sens. (S/N 20db)		2.75MHz	26	32	db
		4.0MHz	26	32	db
		5.0MHz	26	32	db
Calibration		2.5MHz	±50	±100	Hz
		4.0MHz	±50	±100	Hz
		5.0MHz	±50	±100	Hz
Image rejection		5.0MHz	14	8	db
Lowest battery voltage		4.0MHz	1.85	2.1	V
Tuning indicator sens.		4.0MHz	26	32	db
S/N Ratio (1mV)		4.0MHz	32	26	db
Supply voltage : DC 3V	R. O. : 50mW	Load : 8 ohm	Modulation : 1kHz 30% Mod.		

MW ELECTRICAL PERFORMANCE

Test Item		Condition	Nominal	Limit	Unit
Tuning range		Min.	515	522	kHz
		Max.	1640	1620	kHz
Intermediate freq.			460	±3.5	kHz
Max. sens.		600kHz		60	dbμ
		1000kHz		56	dbμ
		1400kHz		56	dbμ
Useable sens. (S/N 20db)		600kHz	60	64	dbμ
		1000kHz	58	62	dbμ
		1400kHz	58	62	dbμ
Calibration		600kHz	±25	±50	kHz
		1000kHz	±40	±70	kHz
		1400kHz	±40	±70	kHz
Freq. Response (−6db)		1000kHz	250	400	Hz
			2400	2000	kHz
Bandwidth		1000kHz	5	3.5-9	kHz
T.H.D. (5mV)		1000kHz	2	4	%
A.G.C. F.O.M.		1000kHz	36	30	db
Image rejection		1400kHz	28	20	db
I.F. rejection		600kHz	30	24	db
Whistle modulation (5mV)		2IF/3IF	10	15	%
Lowest battery voltage		1000kHz	1.85	2.1	V
Tuning indicator sens.		1000kHz	58	62	db
S/N Ratio (5mV)		1000kHz	32	26	db
Supply voltage : DC 3V	R. O. : 50mW	Load : 8 ohm	Modulation : 1kHz 30% Mod.		

LW ELECTRICAL PERFORMANCE (only MS-103L)

Test Item		Condition	Nominal	Limit	Unit
Tuning range		Min.	145	150	kHz
		Max.	285	281	kHz
Intermediate freq.			460	±3.5	kHz
Max. sens.		170kHz		62	dbμ
		220kHz		60	dbμ
		270kHz		60	dbμ
Useable sens. (S/N 20db)		170kHz	64	70	dbμ
		220kHz	62	68	dbμ
		270kHz	62	68	dbμ
Calibration		170kHz	±3	±5	kHz
		220kHz	±4	±8	kHz
		270kHz	±4	±8	kHz
I.F. rejection		270kHz	28	22	db
Lowest battery voltage		220kHz	1.85	2.1	V
Tuning indicator sens.		220kHz	62	68	db
S/N Ratio (5mV)		220kHz	32	26	db
Supply voltage : DC 3V	R. O. : 50mW	Load : 8 ohm	Modulation : 1kHz 30% Mod.		

SW ELECTRICAL PERFORMANCE

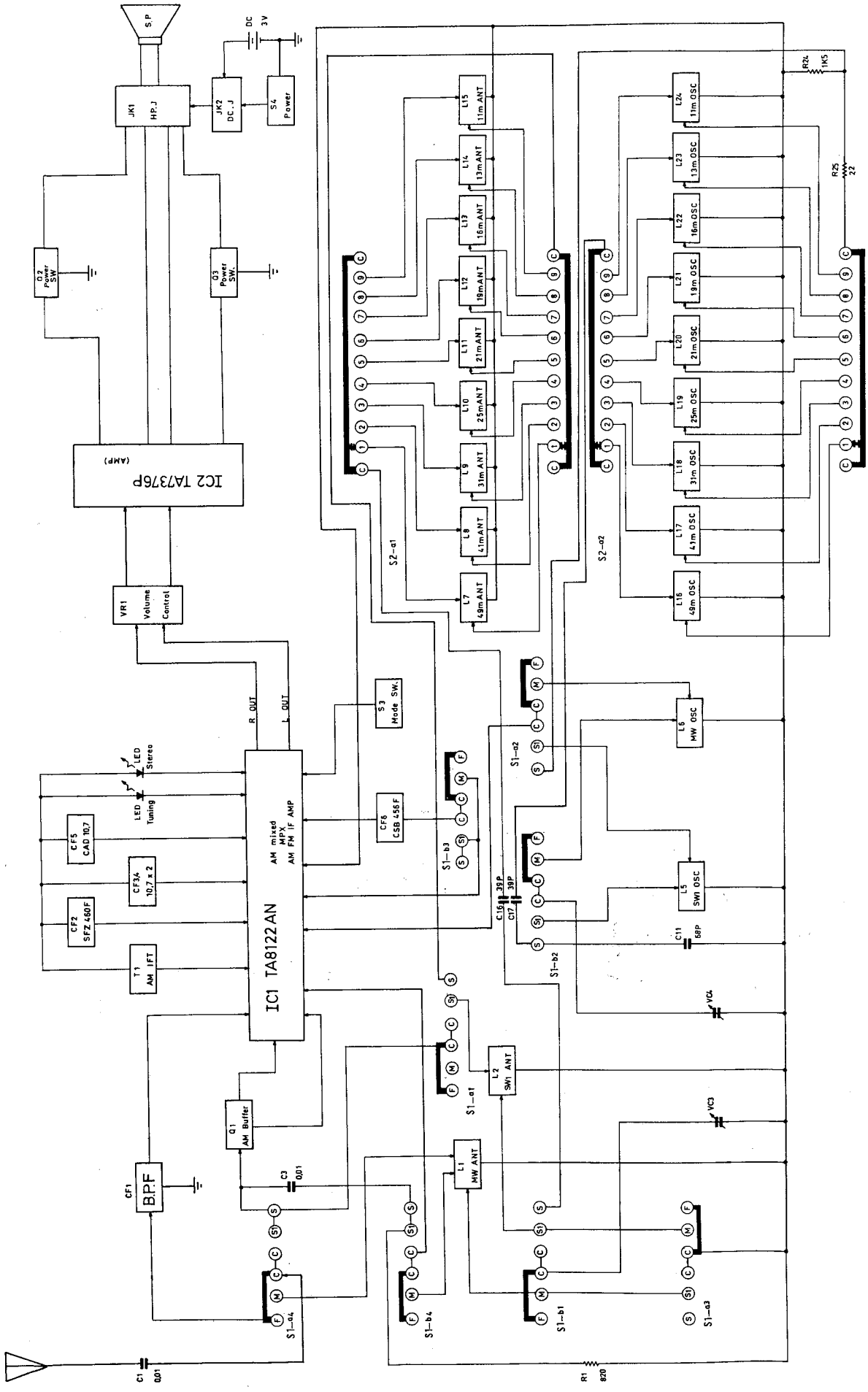
Test Item	Condition	Nominal	Limit	Unit
Tuning range	(SW1) SW2	5.80 - 6.28	5.85 - 6.20	MHz
	(SW2) SW3	7.0 - 7.52	7.05 - 7.45	
	(SW3) SW4	9.40 - 9.97	9.45 - 9.90	
	(SW4) SW5	11.50 - 12.20	11.60 - 12.10	
	(SW5) SW6	13.50 - 13.91	13.55 - 13.85	
	(SW6) SW7	15.00 - 15.70	15.1 - 15.6	
	(SW7) SW8	17.40 - 17.98	17.45 - 17.90	
	(SW8) SW9	21.40 - 21.95	21.45 - 21.85	
	(SW9) SW10	25.60 - 26.19	25.67 - 26.1	
Intermediate freq.		460	±3.5	kHz
Max. sens.	(SW1) SW2: 6.1MHz		16	dbμ
	(SW2) SW3: 7.3MHz		16	
	(SW3) SW4: 9.7MHz		18	
	(SW4) SW5: 11.8MHz		18	
	(SW5) SW6: 13.7MHz		20	
	(SW6) SW7: 15.3MHz		20	
	(SW7) SW8: 17.8MHz		22	
	(SW8) SW9: 21.8MHz		24	
	(SW9) SW10: 25.8MHz		26	
Useable sens.	(SW1) SW2: 6.1MHz	20	26	db
	(SW2) SW3: 7.3MHz	20	26	
	(SW3) SW4: 9.7MHz	22	28	
	(SW4) SW5: 11.8MHz	22	28	
	(SW5) SW6: 13.7MHz	24	30	
	(SW6) SW7: 15.3MHz	24	30	
	(SW7) SW8: 17.8MHz	26	32	
	(SW8) SW9: 21.8MHz	28	34	
	(SW9) SW10: 25.8MHz	28	36	
Calibration		±50	±100	kHz
Image rejection	(SW1) SW2: 6.1MHz	18	12	db
	(SW2) SW3: 7.3MHz	18	12	
	(SW3) SW4: 9.7MHz	16	10	
	(SW4) SW5: 11.8MHz	14	10	
	(SW5) SW6: 13.7MHz	12	8	
	(SW6) SW7: 15.3MHz	10	6	
	(SW7) SW8: 17.8MHz	10	6	
	(SW8) SW9: 21.8MHz	8	4	
	(SW9) SW10: 25.8MHz	5	2	

Test item	Condition		Nominal	Limit	Unit
S/N Ratio (1mV)			32	26	db
Over Load Capacity			80	60	dbμ
Tuning Ind. sens.	(SW1) SW2: 6.1MHz		22	28	dbμ
	(SW2) SW3: 7.3MHz		22	28	
	(SW3) SW4: 9.7MHz		24	30	
	(SW4) SW5: 11.8MHz		24	30	
	(SW5) SW6: 13.7MHz		26	32	
	(SW6) SW7: 15.3MHz		26	32	
	(SW7) SW8: 17.8MHz		28	34	
	(SW8) SW9: 21.8MHz		28	34	
	(SW9) SW10: 25.8MHz		30	36	
Supply voltage : DC 3V	R. O. : 50mW	Load : 8 ohm	Modulation : 1kHz 30% Mod.		

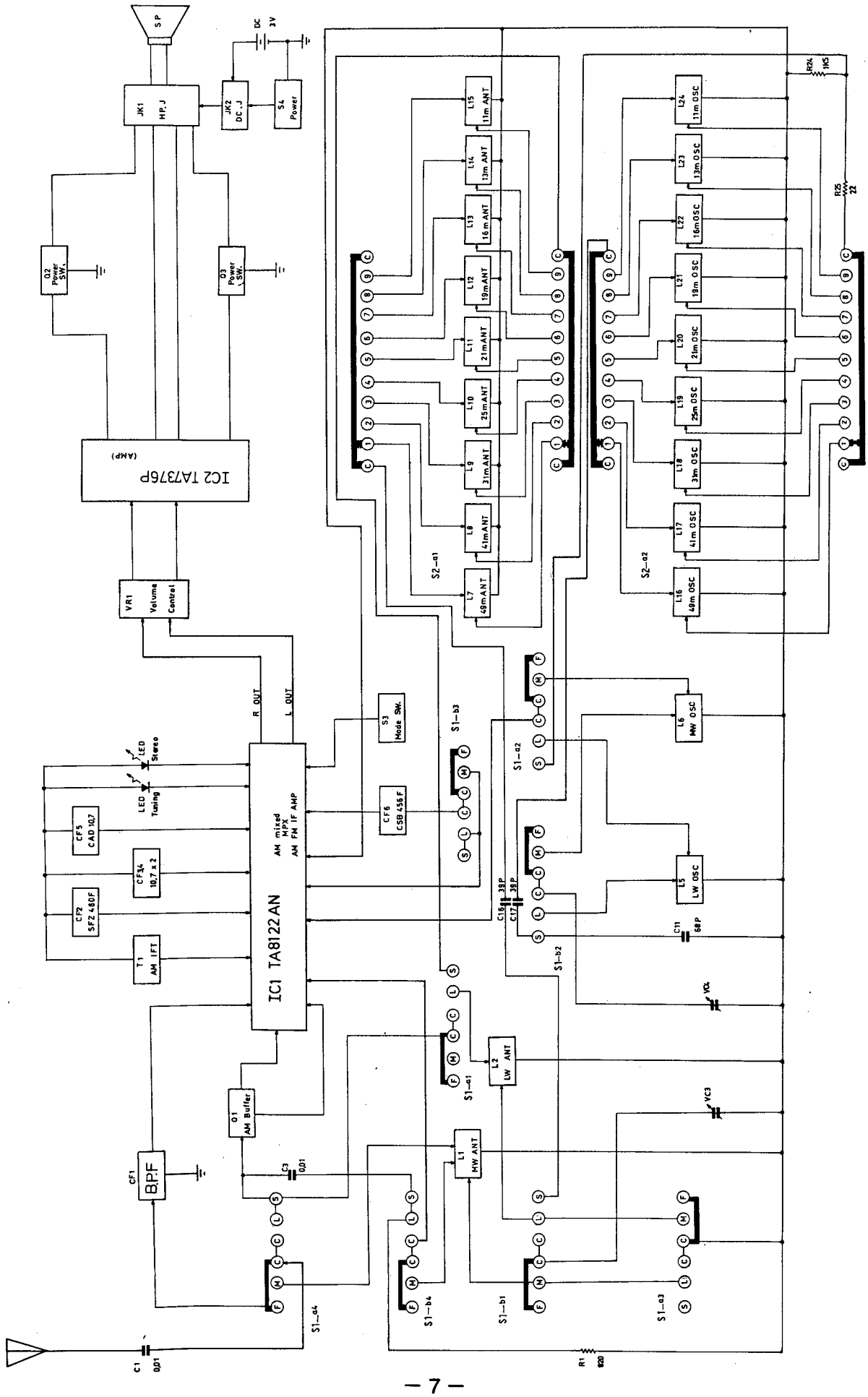
Note: MS-103→SW2-10

MS-103L→SW1-9

BLOCK DIAGRAM (103)



BLOCK DIAGRAM (103L)



TUNER ALIGNMENT INSTRUCTION

FM SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	FM Signal Generator to Ant. terminal output meter (VTVM) across 8 ohm load (Fig.3)	1	87.35±0.15MHz	Tuning Gang fully closed	L4 Adjust for Max. output
		2	108±0.25MHz	Tuning gang fully open	VT4 Adjust for Max. output
		3			Repeat step 1 & 2
TRACKING	FM Signal Generator to Ant. terminal output meter (VTVM) across 8 ohm load (Fig.3)	4	90MHz	Tune to signal	L3 Adjust for Max. output
		5	106MHz	Tune to signal	VT3 Adjust for Max. output
		6			Repeat step 4 & 5

MW SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
IF	AM Signal Generator with loop Ant. output meter (VTVM) across 8 ohm load (Fig.1)	1	460kHz	Tuning gnag fully closed	T1 Adjust for Max. output
BAND	AM Signal Generator with loop Ant. output meter (VTVM) across 8 ohm load (Fig.1)	2	515kHz	Tuning gang fully closed	L6 Adjust for Max. output
		3	1650kHz	Tuning gang fully open	VT2 Adjust for Max. output
		4			Repeat step 2 & 3
TRACKING	AM Signal Generator with loop Ant. output meter (VTVM) across 8 ohm load (Fig.1)	5	600kHz	Tune to signal	L1 Adjust for Max. output
		6	1400kHz	Tune to signal	VT1 Adjust for Max. output
		7			Repeat step 5 & 6

LW SECTION (only MS-103L)

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with loop Ant. output meter (VTVM) across 8 ohm load (Fig.1)	1	145kHz	Tuning gang fully closed	L5 Adjust for Max. output
		2	285kHz	Tuning gang fully open	VT5 Adjust for Max. output
		3			Repeat step 1 & 2
TRACKING	AM Singal Generator with loop Ant. output meter (VTVM) across 8 ohm load (Fig.1)	4	170kHz	Tune to signal	L2 Adjust for Max. output
		5	270kHz	Tune to signal	VT6 Adjust for Max. output
		6			Repeat step 4.& 5

49M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	5.85MHz (1kHz Mod)	Tuning Gang fully closed	L16 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	6.1MHz (1kHz Mod)	Tune to signal	L7 Adjust for Max. output

41M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	7.05MHz (1kHz Mod)	Tuning Gang fully closed	L17 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	7.3MHz (1kHz Mod)	Tune to signal	L8 Adjust for Max. output

31M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	9.45MHz (1kHz Mod)	Tuning Gang fully closed	L18 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	9.7MHz (1kHz Mod)	Tune to signal	L9 Adjust for Max. output

25M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	11.60MHz (1kHz Mod)	Tuning Gang fully closed	L19 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	11.80MHz (1kHz Mod)	Tune to signal	L10 Adjust for Max. output

21M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	13.55MHz (1kHz Mod)	Tuning Gang fully closed	L20 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	13.7MHz (1kHz Mod)	Tune to Signal	L11 Adjust for Max. output

19M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	15.1MHz (1kHz Mod)	Tuning Gang fully closed	L21 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	15.3MHz (1kHz Mod)	Tune to signal	L12 Adjust for Max. output

16M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	17.45MHz (1kHz Mod)	Tuning Gang fully closed	L22 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	17.8MHz (1kHz Mod)	Tune to signal	L13 Adjust for Max. output

13M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	21.45MHz (1kHz Mod)	Tuning Gang fully closed	L23 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	21.8MHz (1kHz Mod)	Tune to signal	L14 Adjust for Max. output

11M BAND SECTION

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	25.67MHz (1kHz Mod)	Tuning Gang fully closed	L24 Adjust for Max. output
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	2	25.8MHz (1kHz Mod)	Tune to signal	L15 Adjust for Max. output

SW_1 SECTION (only MS-103)

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
BAND	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	1	2.2MHz	Tuning gang fully closed	L5 Adjust for Max. output
		2	5.3MHz	Tuning gang	VT5 Adjust for Max. output
		3			Repeat step 1 & 2
TRACKING	AM Signal Generator with 12pf dummy Ant. output meter (VTVM) across 8 ohm load (Fig.2)	4	2.5MHz	Tune to signal	L2 Adjust for Max. output
		5	5MHz	Tune to signal	VT6 Adjust for Max. output
		6			Repeat step 4 & 5

TEST EQUIPMENT CONNECTION

FIGURE 1. MW.IF.BAND /TRACKING ; LW BAND /TRACKING

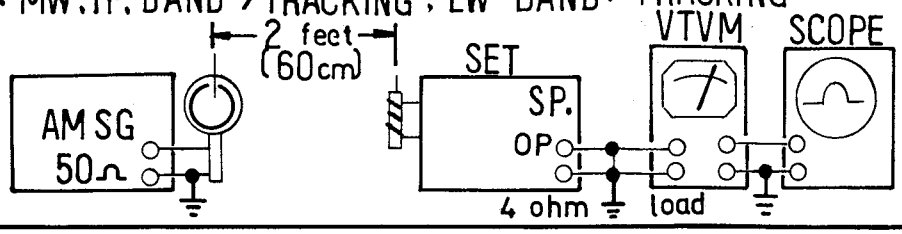


FIGURE 2. SW BAND/TRACKING ; 49M-11MBAND/TRACKING

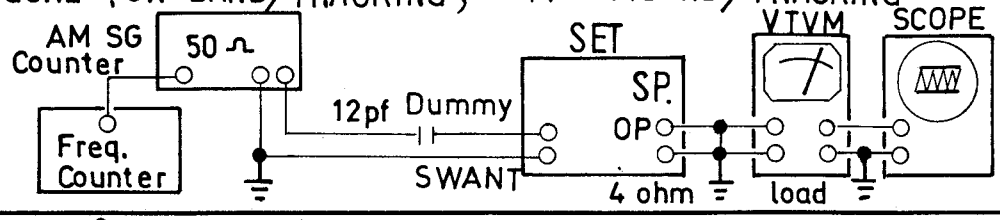
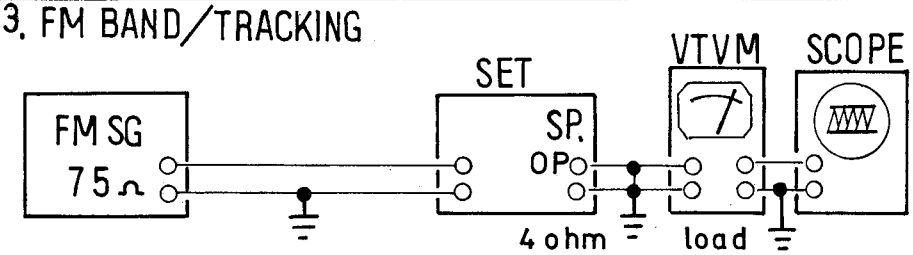
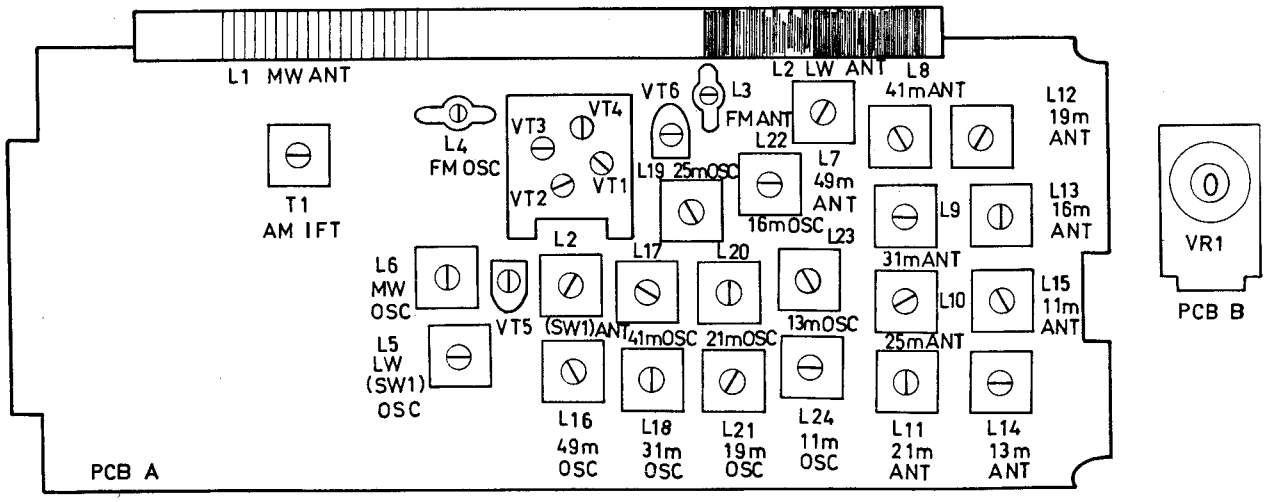


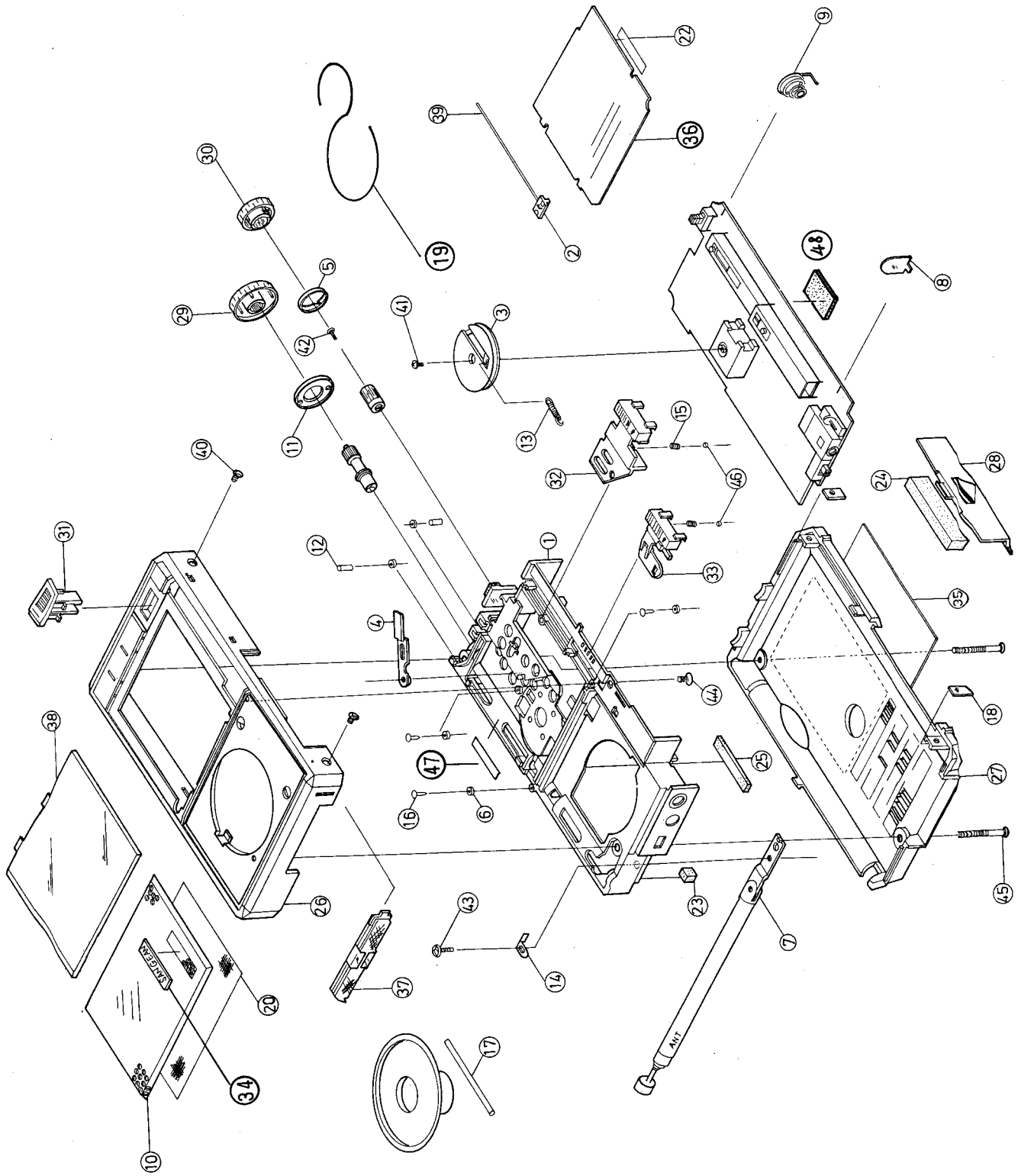
FIGURE 3. FM BAND/TRACKING



TUNER ADJUSTMENT POINTS



DISASSEMBLY DIAGRAM



TEST EQUIPMENT CONNECTION

FIGURE 1. MW. IF. BAND /TRACKING ; LW BAND /TRACKING

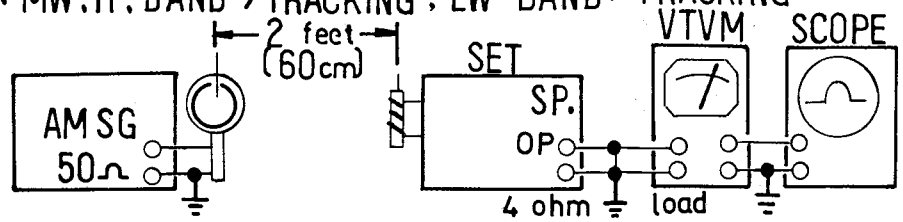


FIGURE 2. SW BAND/TRACKING ; 49M-11M BAND/TRACKING

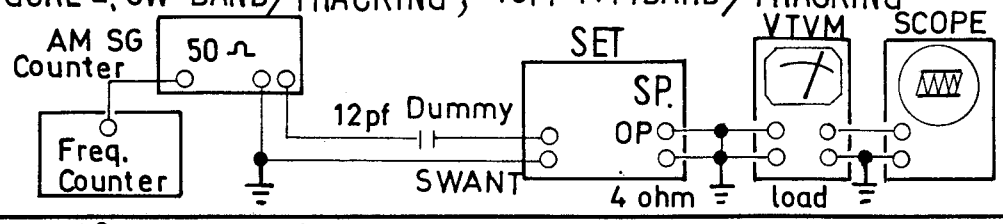
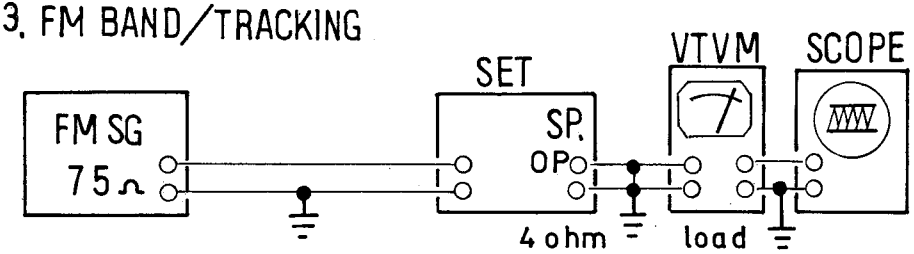
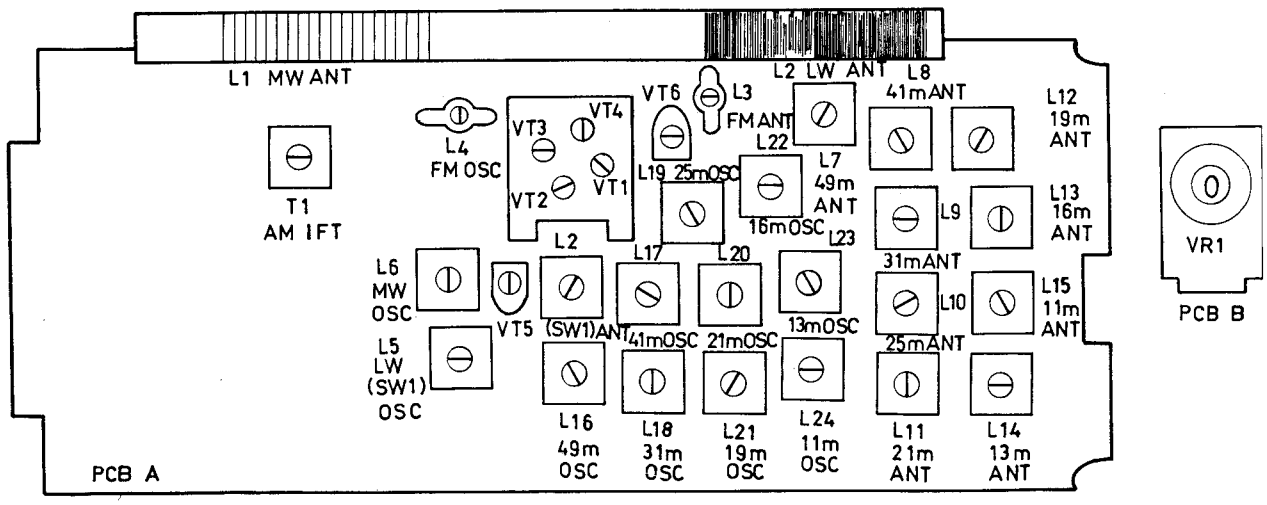


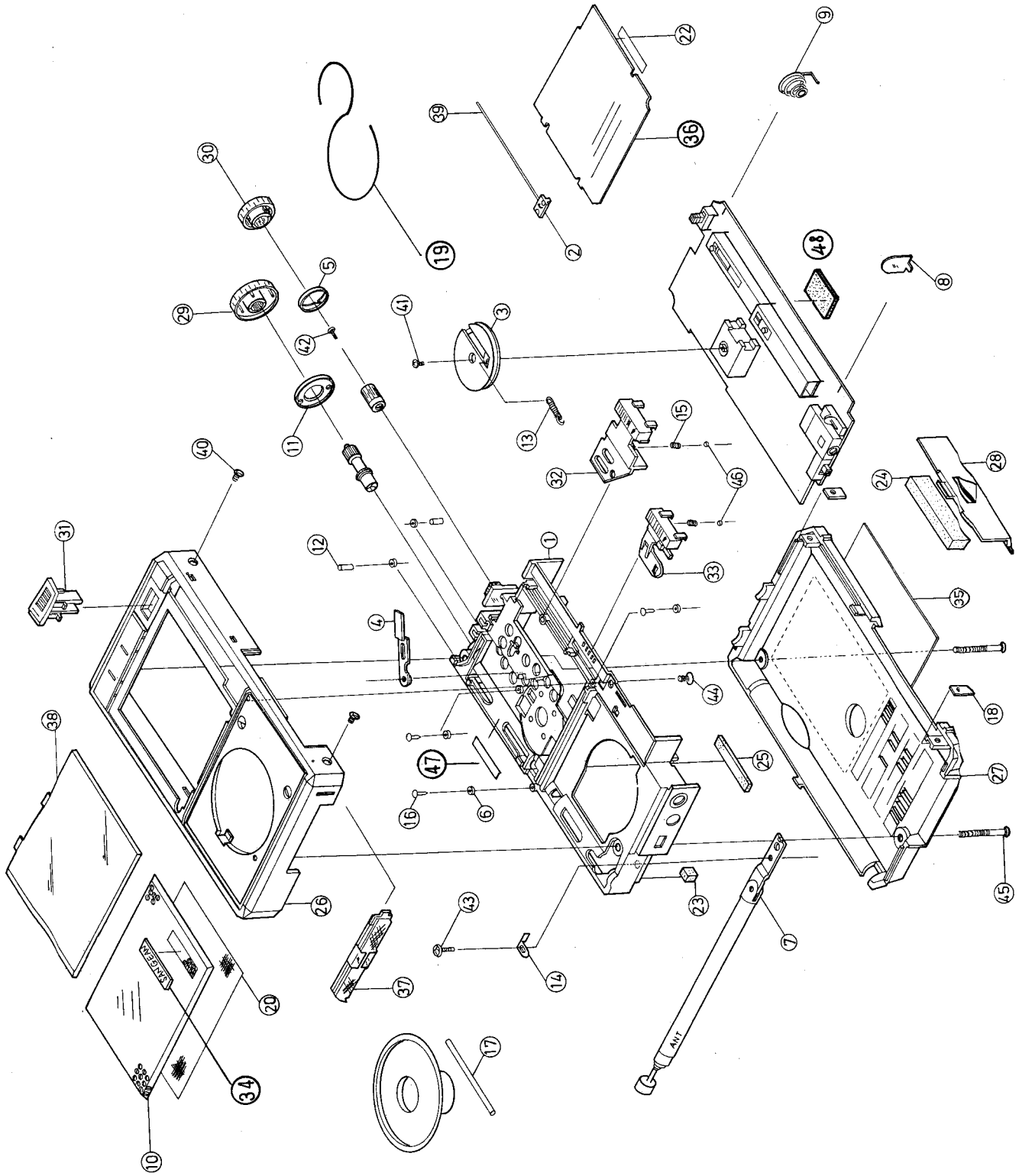
FIGURE 3. FM BAND/TRACKING



TUNER ADJUSTMENT POINTS



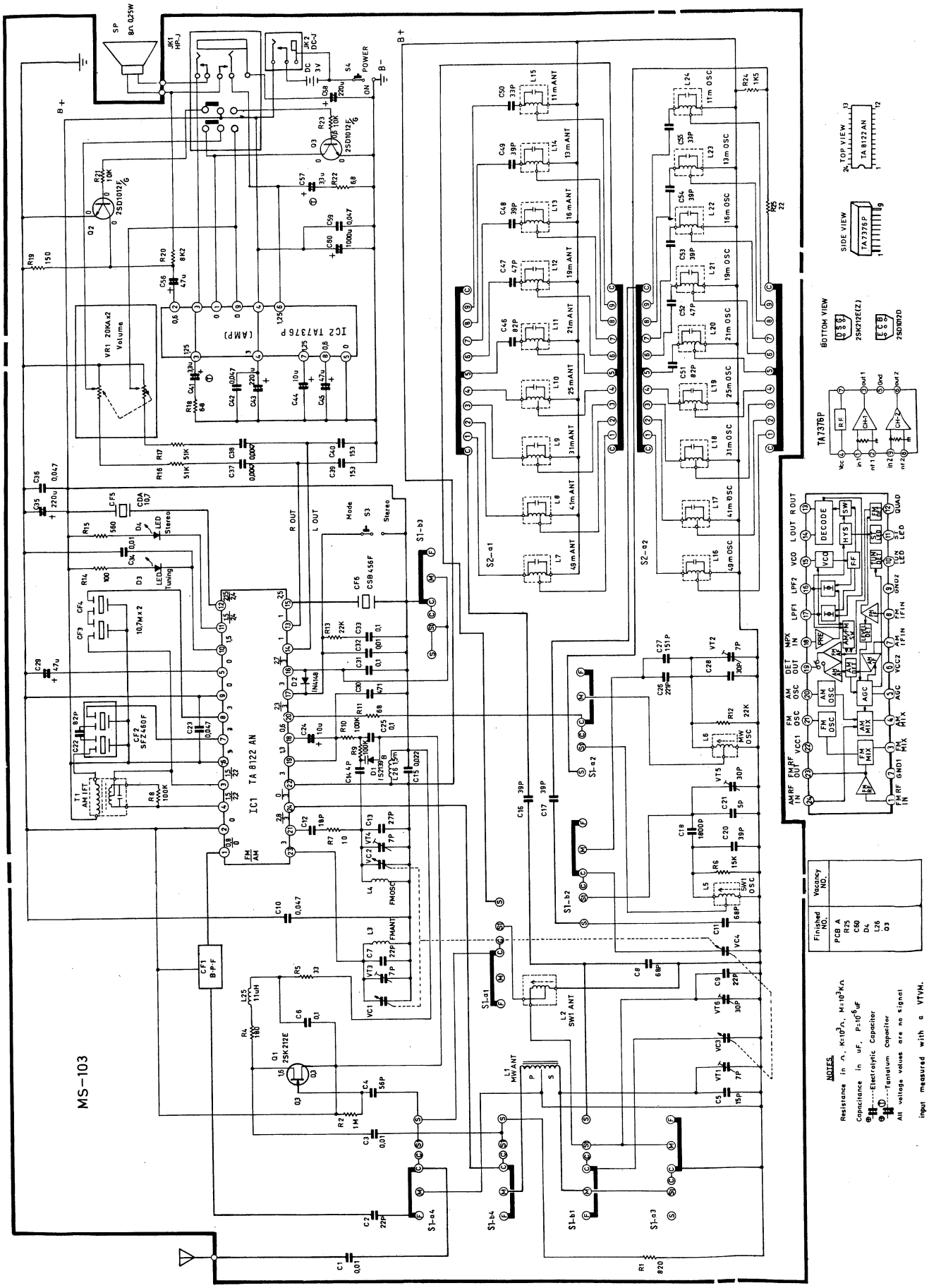
DISASSEMBLY DIAGRAM



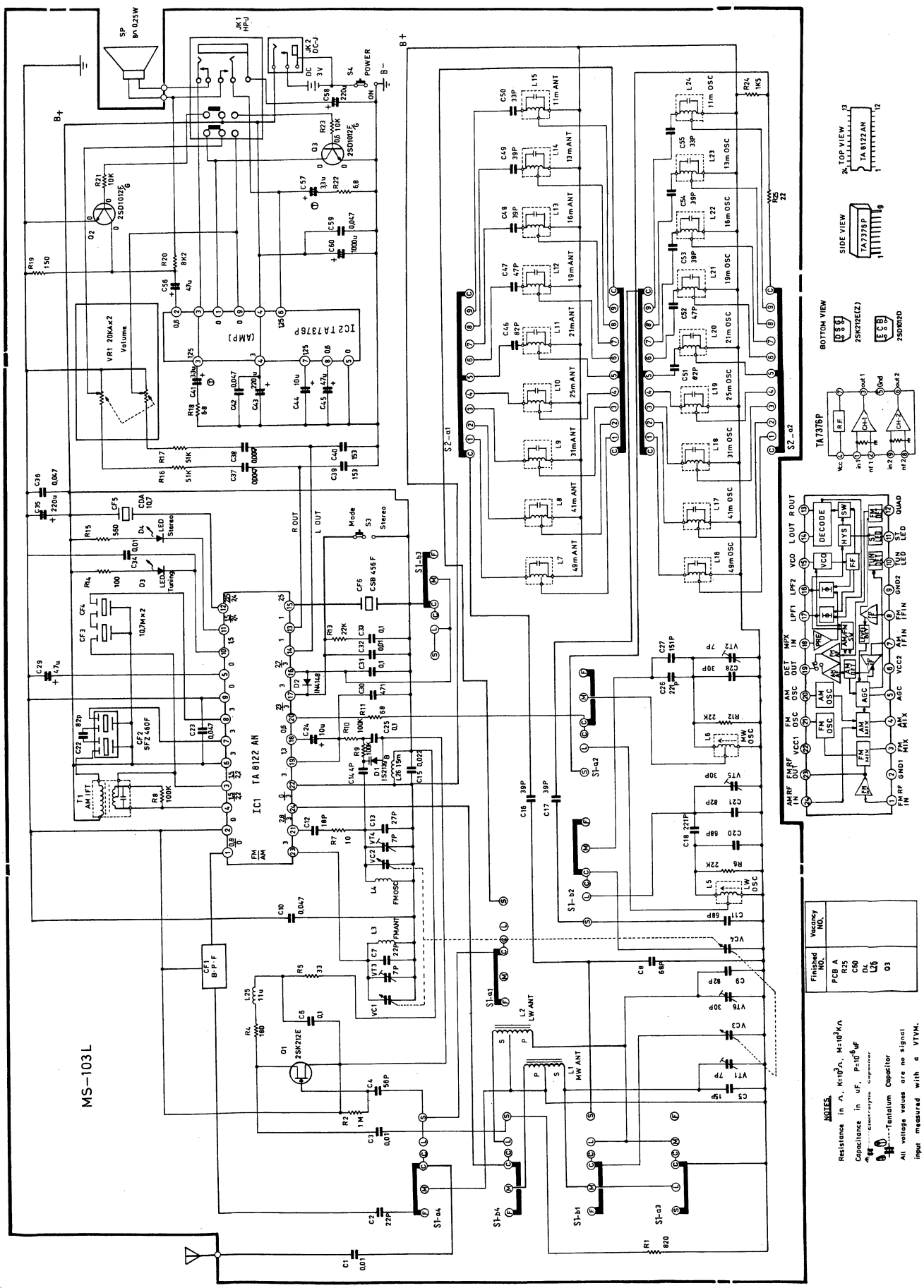
DISASSEMBLY DIAGRAM REMARK

2046000	Middle Chassis	1	A1-103-0113 A2-103-0098	1	
2046010	Pointer Base	1	A3-103-0368	2	
2046020	Dial Drum	1	A3-103-0367	3	
2046030	Transfer Lever	1	A4-103-0990	4	
2046040	VR Shaft	1	A4-103-0991	5	
2014000	Pulley II	5	A4-711-0596	6	
2146001	Rod Ant MS-103	1	RD-043	7	
2146010	Battery Conductor ⊕	1	A4-103-0998	8	
2146020	Battery Spring ⊖	1	A4-103-0999	9	
2146030	Speaker Grill	1	A4-103-0994	10	
2146040	Tuning Shaft	1	A4-103-1000	11	
2146050	Pulley Pin K	2	A4-103-1001	12	
2146060	Fastener	2	A4-103-1008	18	
2145060	Speaker Fixed-Bar	1	A4-101-0955	17	
2145080	Dial Spring	1	A4-101-1011	13	
2114050	Rod Ant Contact	1	A4-711-0610	14	
2116020	Click Spring	2	A4-789-0650	15	
2116090	Pulley Pin J	3	A4-789-0656	16	
2246010	Dial String 0.4/384	1		19	
2346000	Salon Net	1	A4-103-1002	20	
2346020	Double Face Tape(II)	1	A4-103-1089	22	Dial Plate-Chassis
2346040	Ant Bar Sponge(I)	1	A4-103-1094	23	
2346050	Ant Bar Sponge (II)	1	A4-103-1099	25	
2307000	Battery Sponge	1	A4-701-0376	24	
2335040	Double Side Tape	1	A4-212-0902	47	Dial Plate-Chassis
2346060	Space Sponge	1	A4-103-1126	48	Mian PCB-Back Cover
3014600	Front Cabinet	1	A1-103-0112 A2-103-0097	26	
3034600	Back Cover	1	A1-103-0114	27	
3044600	Battery Cover	1	A4-103-0983	28	
3084600	Tuning Knob	1	A4-103-0984	29	
3094600	Volume Knob	1	A4-103-0985	30	
3104600	Power Knob	1	A4-103-0896	31	
3114600	Main Band Knob	1	A3-103-0365	32	
3124600	SW Band Knob	1	A3-103-0366	33	
3214600	Name Plate	1	A4-103-0997	34	
3224600	ID Plate	1	A4-103-0993	35	
3264500	Hand Strap	1	A4-101-0971/0976	37	
3324600	Dial Backboard	1	A4-103-0992	36	
3334600	Pointer	1	A4-103-1006	39	
3364600	Dial Window	1	A4-103-0988	38	
9000106	M Screw 2x6 P	1		43	Rod Ant-PCB-Chassis
9020003	M Screw 1.7x3 P Ni	1		41	PVC-Drum
9020604	M Screw 1.4x4 P Ni	1		42	VR-Shaft
9021105	M Screw 2x5 F Ni	2		40	Front-Back
9311206	Tap Tite Screw 2.6x6 F BK	1		44	Chassis-Front
9120224	Tap Screw 2.6x24 P Ni	2		45	Front-Back
9907030	Steel Ball	2		46	

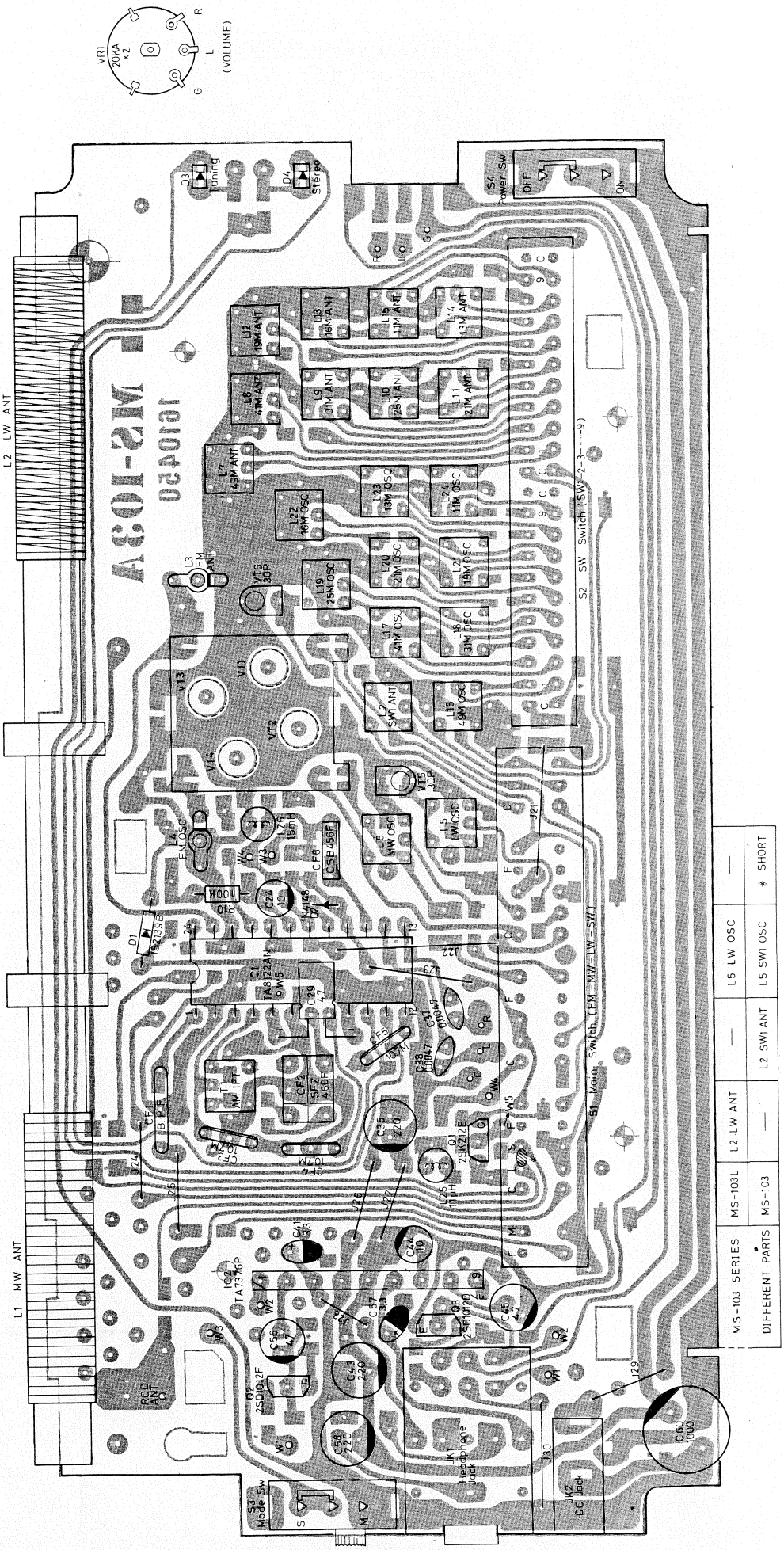
SCHEMATIC DIAGRAM (103)



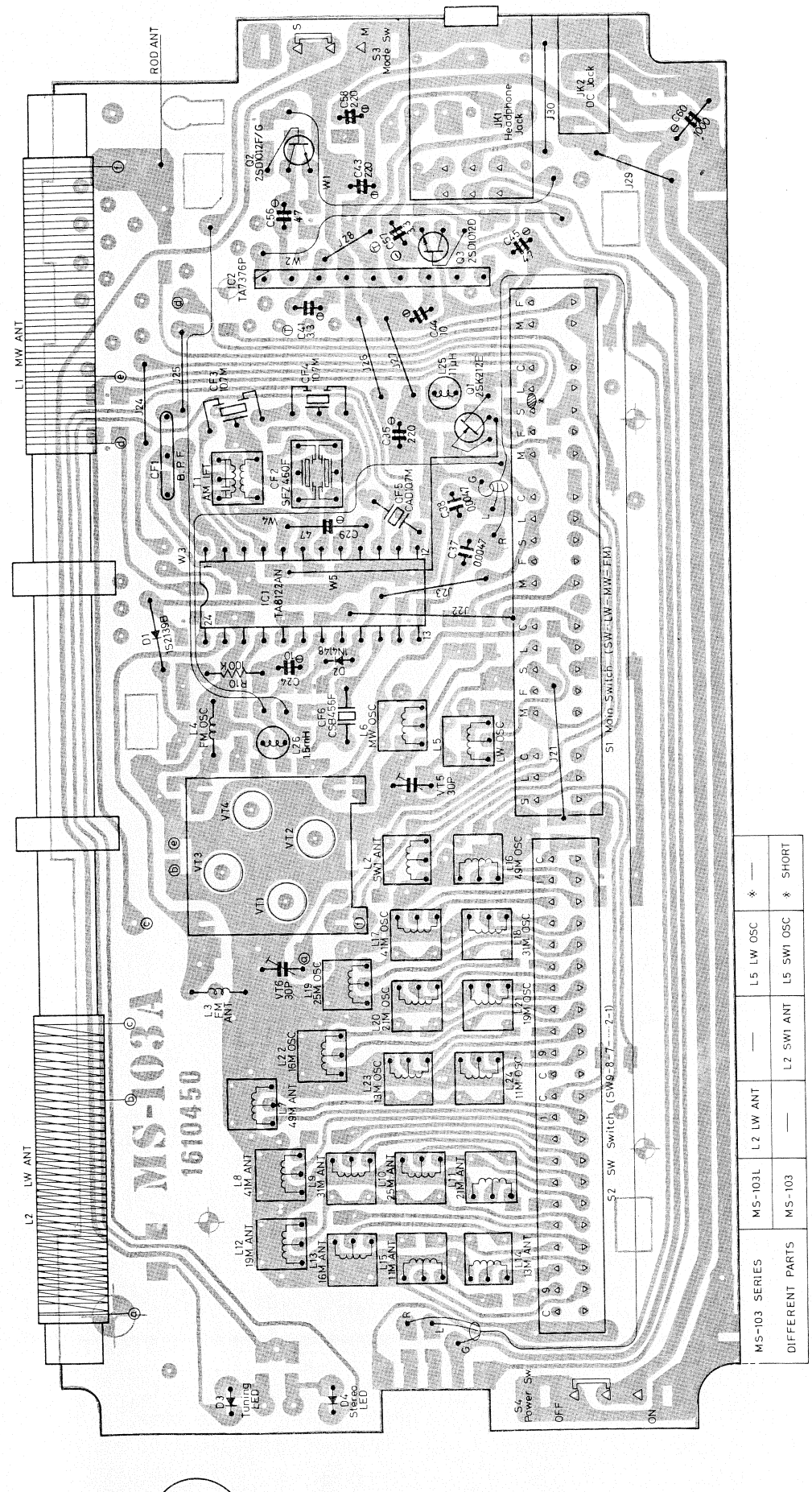
SCHEMATIC DIAGRAM (103L)



PCB TOP VIEW DIAGRAM

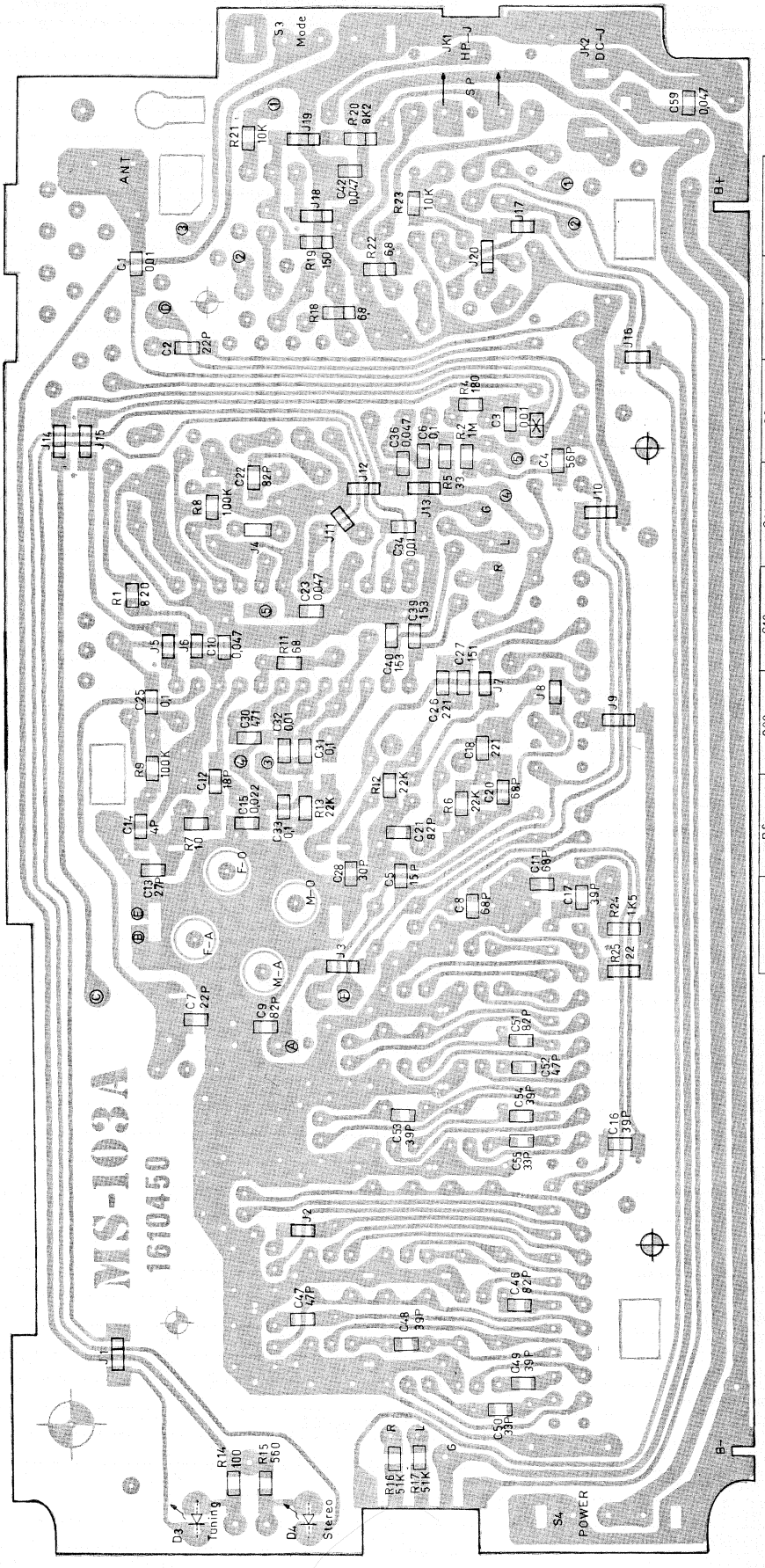


PCB BOTTOM VIEW DIAGRAM (A)



MS-103 SERIES	MS-103L	L2 LW ANT	—	L5 LW OSC	* —
DIFFERENT PARTS	MS-103	—	L2 SW1 ANT	L5 SW1 OSC	* SHORT

PCB BOTTOM VIEW DIAGRAM (B)



103L	R6 22K	C20 68P	C18 221P	C21 82P	C9 82P	J14	—
103	15K	39P	1800P	5P	22P	—	* short

PARTS LIST

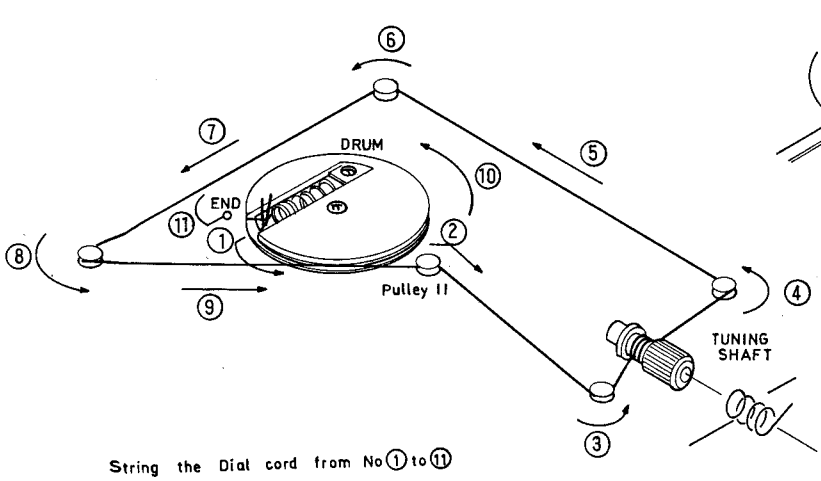
PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK	
1011010	IC TA7376P	1		IC2	
1011030	IC TA8122AN	1	IC-030	IC1	
1020170/1	TR 2SD1012F/G	2		Q2,3	
1030001	FET 2SK212E	1		Q1	
1040020	Diode 1N4148	1		D2	
1040040	Diode 1S2139B	1		D1	
1050100	LED RED 1x5(B)	1	L-030	D4	RT-152PRS
1053060	LED GRN 1x5	1	L-030	D3	RT-152SGS
1121970	Aaj. Coil 1970	1	Adj. Coil-084	L5	LW OSC only MS-103L
1110320	Bar & Coil 0320	1	Ant Bar-044	L1	1441A
1110330	Bar & Coil 0330	1	Ant Bar-045	L1,2	1439A
1121610/	Adj. Coil 1610/	1		L4	FM OSC
1121670	Adj. Coil 1670				only MS-103L
1121690/	Adj. Coil 1690/	1		L3	FM ANT
1140030	SP Coil 4.5φx3.75T	7			
1121860	Adj. Coil 1860	1	Adj. Coil-084	T1	AM IFT
1121870	Adj. Coil 1870	1	Adj. Coil-084	L2	SW1 ANT
1121881	Adj. Coil 1881	1	Adj. Coil-095	L7	49M ANT
1121891	Adj. Coil 1891	1	Adj. Coil-095	L8	41M ANT
1121901	Adj. Coil 1901	1	Adj. Coil-095	L9	31M ANT
1121911	Adj. Coil 1911	1	Adj. Coil-095	L10	25M ANT
1121921	Adj. Coil 1921	1	Adj. Coil-095	L11	21M ANT
1121931	Adj. Coil 1931	1	Adj. Coil-095	L12	19M ANT
1121941	Adj. Coil 1941	1	Adj. Coil-095	L13	16M ANT
1121951	Adj. Coil 1951	1	Adj. Coil-095	L14	13M ANT
1121961	Adj. Coil 1961	1	Adj. Coil-095	L15	11M ANT
1121980	Adj. Coil 1980	1	Adj. Coil-084	L6	MW OSC
1121990	Adj. Coil 1990	1	Adj. Coil-084	L5	SW1 OSC
1122000	Adj. Coil 2000	1	Adj. Coil-084	L16	49M OSC
1122010	Adj. Coil 2010	1	Adj. Coil-084	L17	41M OSC
1122020	Adj. Coil 2020	1	Adj. Coil-084	L18	31M OSC
1122030	Adj. Coil 2030	1	Adj. Coil-084	L19	25M OSC
1122040	Adj. Coil 2040	1	Adj. Coil-084	L20	21M OSC
1122050	Adj. Coil 2050	1	Adj. Coil-084	L21	19M OSC
1122060	Adj. Coil 2060	1	Adj. Coil-084	L22	16M OSC
1122070	Adj. Coil 2070	1	Adj. Coil-088	L23	13M OSC
1122080	Adj. Coil 2080	1	Adj. Coil-089	L24	11M OSC
1130030	Fixed Coil 11μH	1		L25	
1130090	Fixed Coil 1.5mH	1		L26	
1200120	PVC(M)-789	1			22KT16B/R-6564
1210001	TC 30P(A)	2		VT5,6	VCT31F125A
1310110	R-VR 20KAx2(A)	1		VR1	RK892A001D
1610450	PCB MS-103(A)	1			Main,VR
1620180	SP 2" 8ohm 0.25W(B)	1	SP-055		S880242-020R
1630010	Switch 1P2C(A)	1	S-SW-022	S4	SSTP12P-06V
1630180	Switch 8P4C-(B)	1		S1	SSA084PD5
1630190	Switch 1P2C(E)	1	S-SW-051	S3	SS12ZA-03P
1630400	Switch 4P9C(A)	1		S2	SSSA049ND1-SG
1640030	Jack Headphone(D)	1		JK1	HSJ0864-01-410
1647020	Jack DC(C)	1	JK-030	JK2	HEC1737-01-510
1660110	Filter SFZ460F	1		CF2	
1660141	Filter SFE10.7MA5-B	1		CF4	BLUE
1660250	Filter PFWE8	1	F-031	CF1	88-108MHz
1660260	Filter CSB456F16	1	F-032	CF6	
1660290	Filter KMFC411-Z	1		CF3,5	1660140 1660280
4333500	TA 335M 6.3V	2		C41,57	
4147215	CC 472M 50V F05	2		C37,38	

PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
4410600	EL 106M 16V 4x7	2		C24,44
4447601	EL 476M 6.3V 5x7	3		C29,45,56
4422712	EL 227M 6.3V 6x8	3		C35,43,58
4410814	EL 108M 6.3V 10x12.5	1		C60
8000010	W/Jump 5(10)0.6¢	1		J28
8000030	W/Jump 7.5(10)0.6¢	5		J24,25,26,27,29
8000040	W-Jump 10(10)0.6¢	2		J23,30
8000050	W/Jump 12.5(10)0.6¢	1		J21
8000090	W/Jump 15(10)0.6¢	1		J22
8150962	W/PVC 65(9+9)RED	1	AWG#26(0.16x7)	W1
8150969	W/PVC 65(9+9)WHT	1	AWG#26(0.16x7)	W2
8151066	W/PVC 70(9+9)BLUE	1	AWG#26(0.16x7)	W4
8151464	W/PVC 90(9+9)YEW	1	AWG#26(0.16x7)	W3
8170611	W/PVC 50(3+3)BRN	1	AWG#28(0.12x7)	W5
8590105	W/PVC 90(14+24)GRN	1	W-10	
8600050	W/Shield/3 120	1	W-012	
4004001	CH CC 040C 50V NPO-A	1		C14
4005001	CH CC 050C 50V NPO-A	1		C21
4015001	CH CC 150J 50V NPO-A	1		C5
4018001	CH CC 180J 50V NPO-A	1		C12
4022001	CH CC 220J 50V NPO-A	3		C2,7,9
4027001	CH CC 270J 50V NPO-A	1		C13
4030001	CH CC 300J 50V NPO-A	1		C28
4033001	CH CC 330J 50V NPO-A	2		C50,55
4039001	CH CC 390J 50V NPO-A	7		C16,17,20,48, C49,53,54
4047001	CH CC 470J 50V NPO-A	2		C47,52
4056001	CH CC 560J 50V NPO-A	1		C4
4068001	CH CC 680J 50V NPO-A	2		C8,11
4082001	CH CC 820J 50V NPO-A	3		C22,46,51
4015101	CH CC 151J 50V NPO-A	1		C27
4022101	CH CC 221J 50V NPO-A	1		C26
4047101	CH CC 471J 50V NPO-A	1		C30
4010308	CH CC 103M 25V X7R-A	4		C1,3,32,34
4015308	CH CC 153M 25V X7R-A	2		C39,40
4022308	CH CC 223M 25V X7R-A	1		C15
4047309	CH CC 473M 50V Z5U-A	5		C10,23,36,42,59
4010410	CH CC 104M 25V Y5V-A	4		C6,25,31,33
4018220	CH CC 182J 50V NPO-B	1		C18
6120194	CH Jump 0J-A	9		J2,4,5,6,7,8,11, J16,17
6120112	CH RD 1/10W 10J-A	1		R7
6120118	CH RD 1/10W 33J-A	1		R5
6120122	CH RD 1/10W 68J-A	1		R11
6120124	CH RD 1/10W 100J-A	1		R14
6120127	CH RD 1/10W 180J-A	1		R4
6120133	CH RD 1/10W 560J-A	1		R15
6120135	CH RD 1/10W 820J-A	1		R1
6120148	CH RD 1/10W 10KJ-A	2		R21,23
6120150	CH RD 1/10W 15KJ-A	1		R6
6120152	CH RD 1/10W 22KJ-A	2		R12,13
6120196	CH RD 1/10W 51KJ-A	2		R16,17
6120160	CH RD 1/10W 100KJ-A	2		R8,9
6120172	CH RD 1/10W 1MJ-A	1		R2
6120152	CH RD 1/10W 22KJ-A	3		R6,12,13 only MS-103L
6140194	CH RD 1/8W 0J-B	10		J1,3,9,10,12, J13,15,18,19,20
6140110	CH RD 1/8W 6.8J-B	2		R18,22

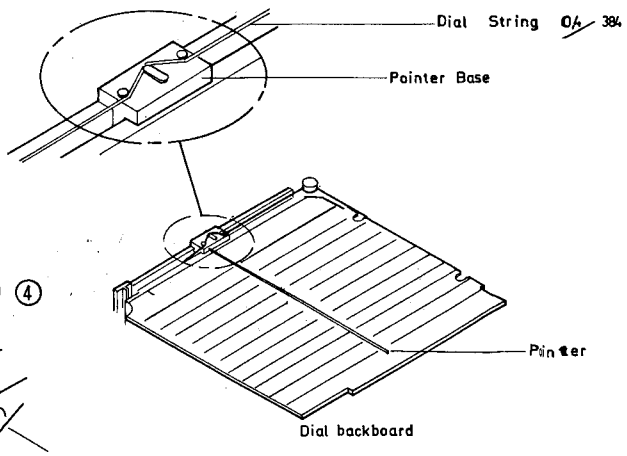
PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
6140116	CH RD 1/8W 22J-B	1		R25
6140126	CH RD 1/8W 150J-B	1		R19
6140138	CH RD 1/8W 1.5KJ-B	1		R24
6140147	CH RD 1/8W 8.2KJ-B	1		R20
6010560	RD 1/8W 100KJSM5	1		R10
4022001	CH CC 220J 50V NPO-A	2		C2,7 only MS-103L
4039001	CH CC 390J 50V NPO-A	6		C16,17,48,49, C53,54 only MS-103L
4068001	CH CC 680J 50V NPO-A	3		C8,11,20 only MS-103L
4082001	CH CC 820J 50V NPO-A	5		C9,21,22,46,51 only MS-103L
4022101	CH CC 221J 50V NPO-A	2		C18,26 only MS-103L
2046000	Middle Chassis	1	A1-103-0113 A2-103-0098	
2046010	Pointer Base	1	A3-103-0368	
2046020	Dial Drum	1	A3-103-0367	
2046030	Transfer Lever	1	A4-103-0990	
2046040	VR Shaft	1	A4-103-0991	
2014000	Pulley II	5	A4-711-0596	
2146001	Rod Ant MS-103	1	RD-043	
2146010	Battery Conductor ⊕	1	A4-103-0998	
2146020	Battery Spring ⊖	1	A4-103-0999	
2146030	Speaker Grill	1	A4-103-0994	
2146040	Tuning Shaft	1	A4-103-1000	
2146050	Pulley Pin K	2	A4-103-1001	
2146060	Fastener	2	A4-103-1008	
2145060	Speaker Fixed-Bar	1	A4-101-0955	
2145080	Dial Spring	1	A4-101-1011	
2114050	Rod Ant Contact	1	A4-711-0610	
2116020	Click Spring	2	A4-789-0650	
2116090	Pulley Pin J	3	A4-789-0656	
2246010	Dial String 0.4/384	1		
2346000	Salon Net	1	A4-103-1002	
2346020	Double Face Tape(II)	1	A4-103-1089	Dial Plate-Chassis
2346040	Ant Bar Sponge(I)	1	A4-103-1094	
2346050	Ant Bar Sponge (II)	1	A4-103-1099	
2307000	Battery Sponge	1	A4-701-0376	
2335040	Double Side Tape	1	A4-212-0902	Dial Plate-Chassis
2346060	Space Sponge	1	A4-103-1126	Mian PCB-Back Cover
3014600	Front Cabinet	1	A1-103-0112 A2-103-0097	
3034600	Back Cover	1	A1-103-0114	
3044600	Battery Cover	1	A4-103-0983	
3084600	Tuning Knob	1	A4-103-0984	
3094600	Volume Knob	1	A4-103-0985	
3104600	Power Knob	1	A4-103-0896	
3114600	Main Band Knob	1	A3-103-0365	
3124600	SW Band Knob	1	A3-103-0366	
3214600	Name Plate	1	A4-103-0997	
3224600	ID Plate	1	A4-103-0993	
3264500	Hand Strap	1	A4-101-0971/0976	
3324600	Dial Backboard	1	A4-103-0992	
3334600	Pointer	1	A4-103-1006	
3364600	Dial Window	1	A4-103-0988	
9000106	M Screw 2x6 P	1		Rod Ant-PCB-Chassis
9020003	M Screw 1.7x3 P Ni	1		PVC-Drum
9020604	M Screw 1.4x4 P Ni	1		VR-Shaft
9021105	M Screw 2x5 F Ni	2		Front-Back
9311206	Tap Tite Screw 2.6x6 F BK	1		Chassis-Front
9120224	Tap Screw 2.6x24 P Ni	2		Front-Back

PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
9907030	Steel Ball	2		
2216010	Label Series No.	1		
3354500	Headphone MS-101	1		
3464600	Label Trigonal	1		
3764600	Leather Case	1		
3784600	Instruction Book	1		
3799900	Wave Handbook	1		
3824600	PVC Cushion	1	A2-103-0107	
3863800	Packing Sponge(F)	1	A4-796-0944	186x115x10mm
3904600	Gift Box	1	A1-103-0121	
3944600	Inner Carton	1/10		
3964600	Exporter Carton	1/20		
1630290	Filter KMFC411-Z	1		CF3,5
1630140	Filter SFE10.7MA5	1		CF3
1630280	Filter CDA10.7MG16-Z	1		CF5

DIAL CORD STRINGING DIAGRAM

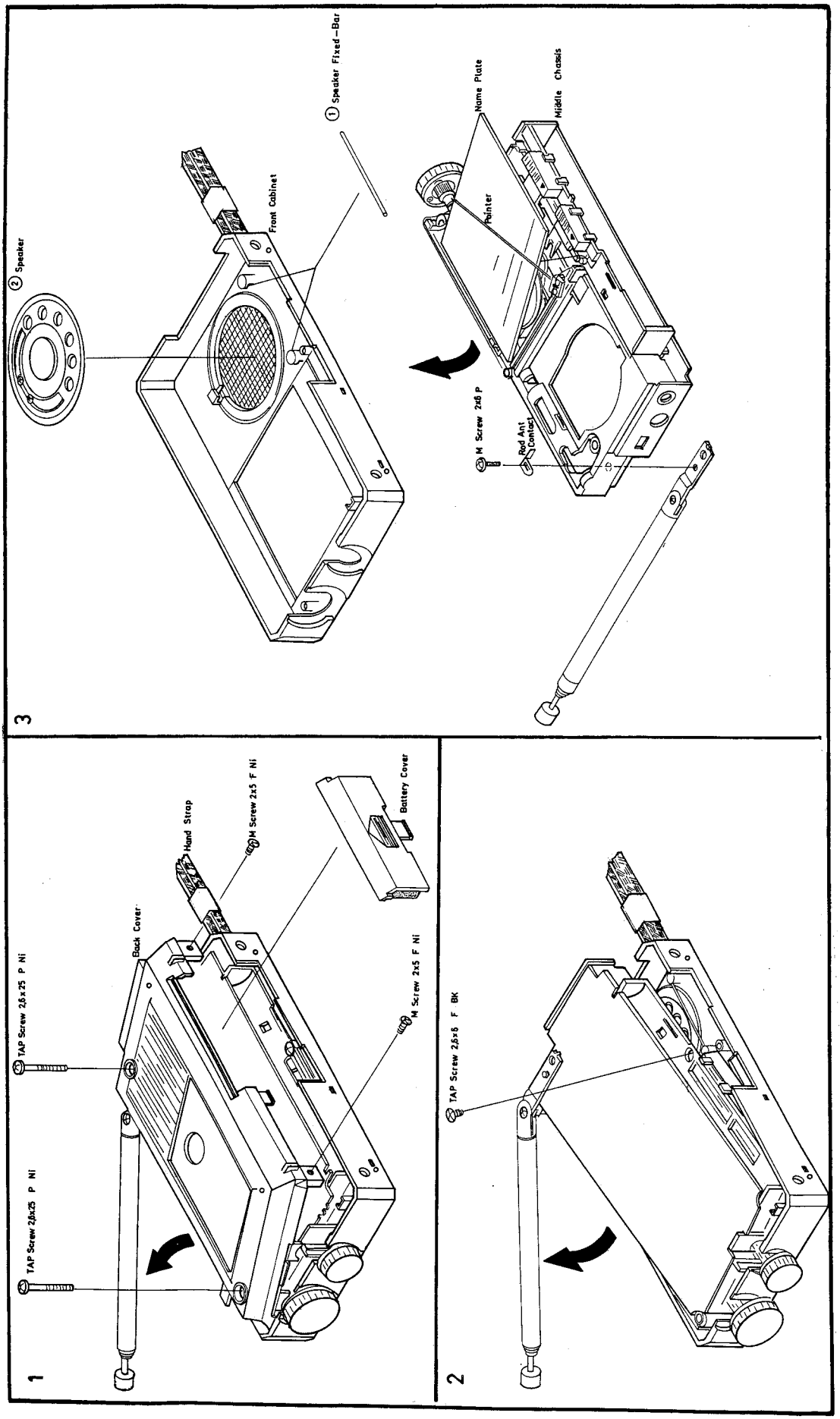


String the Dial cord from No ① to ⑪



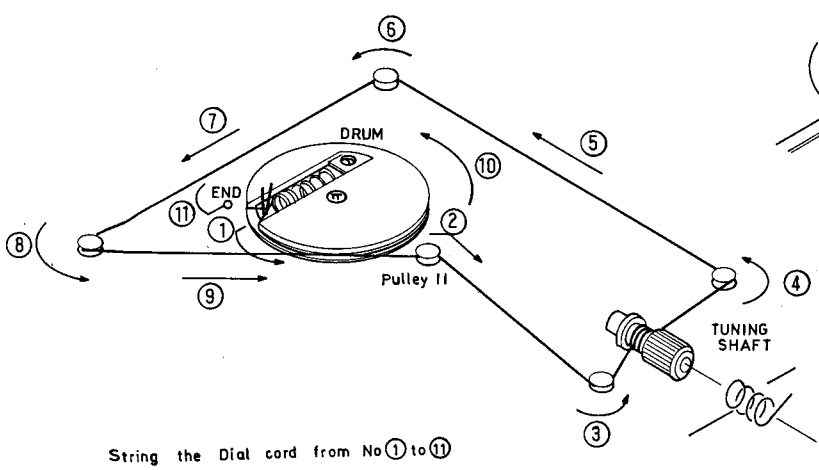
DIAL POINTER SETTING

DISASSEMBLY INSTRUCTIONS

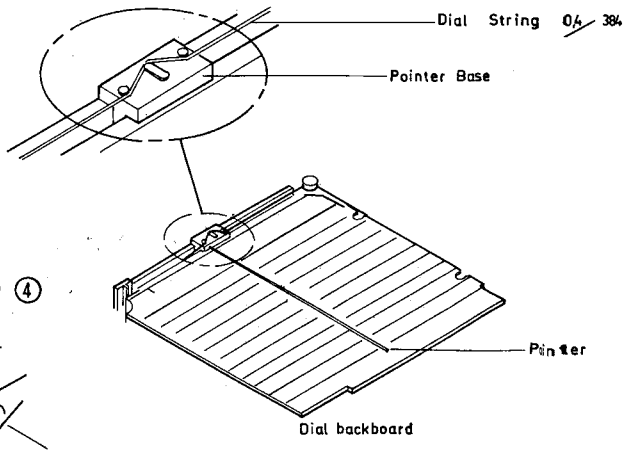


PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
9907030	Steel Ball	2		
2216010	Label Series No.	1		
3354500	Headphone MS-101	1		
3464600	Label Trigonal	1		
3764600	Leather Case	1		
3784600	Instruction Book	1		
3799900	Wave Handbook	1		
3824600	PVC Cushion	1	A2-103-0107	
3863800	Packing Sponge(F)	1	A4-796-0944	186x115x10mm
3904600	Gift Box	1	A1-103-0121	
3944600	Inner Carton	1/10		
3964600	Exporter Carton	1/20		
1630290	Filter KMFC411-Z	1		CF3,5
1630140	Filter SFE10.7MA5	1		CF3
1630280	Filter CDA10.7MG16-Z	1		CF5

DIAL CORD STRINGING DIAGRAM



String the Dial cord from No ① to ⑪



DIAL POINTER SETTING

DISASSEMBLY INSTRUCTIONS